C.I.M. Suite: Delivering 3D modeling and simulation of critical infrastructure systems

Protecting and managing critical infrastructures in emergencies is crucial in today's high-technology world. Terrorists are determined to commit violent acts that threaten cities, states and the federal government. Accidents can devastate people and their support systems. And, of course, natural disasters like tsunamis or hurricanes cause human suffering and severe infrastructure damage.

In 2002, RAND studies highlighted our poor understanding of the relationships that link critical infrastructures. For example, losing electrical power creates a cascade of events – people leaving work early, traffic congestion with stoplights inoperable, auto accidents, and repair crews moving to the outage scene.

CIMSuite offers a breakthrough tool for critical infrastructure management. It illustrates and predicts the domino effect of these interdependent relationships among critical infrastructures. Connecting multiple infrastructure sectors, it uses sophisticated artificial intelligence code for realistic modeling and simulations of interactions. Using a war gaming approach, CIMSuite:

- Visually models interdependencies;
- Employs electronic images like maps and satellite photos;
- Characterizes properties of infrastructure systems;
- Accepts live sensor inputs;
- Delivers 3D operational graphics;
- Visualizes impact areas; and
- Works on multiple platforms and is less than 10 megabytes in size.

"CIMSuite offers simple tools for systems representations, as well as more complex computer models like this one of Baltimore Harbor," said INL computer scientist Donald Dudenhoeffer. "Both demonstrate the three primary tools in CIMSuite. First, the Model Builder is used to integrate multiple infrastructures into one simulation framework and create the interdependency links. Then, the CIMSuite Core combines and processes the static and live sensor data in order to illustrate the cause-effect relationships. This gives life to the Baltimore Harbor model, so decision-makers can see what is happening and react quickly. The Event Sequence Planner helps predict various scenarios, including human response, for likely events. Decision-makers can rapidly evaluate courses of action and direct responses."

Idaho National Laboratory

An innovative critical infrastructure management tool, CIMSuite has been tested by the U.S. Air Force, U.S. departments of Energy and Defense, and the Technical Support Working Group. No other technologies offer such portability and capabilities in representation and prediction for decision-makers. CIMSuite also is attractive for its:

- Simplicity of training and use;
- Adaptability and response;
- Affordable implementation; and
- High-quality, three-dimensional representation of complex critical infrastructure systems and their interrelationships.

“CIMSuite delivers a breakthrough for government and industry,” said Dudenhoeffer. “It is an affordable, robust critical infrastructure planning tool to identify weaknesses, visualize complex relationships and make decisions ‘on the fly’ during emergencies. It is scalable and adaptable for use in monitoring and restoring electrical power, drinking water, telecommunications, transportation, emergency services and much more.”

As you can see, CIMSuite helps critical infrastructure managers and decision-makers be prepared for daily operations and crises as they occur.